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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,973	02/01/2005	Niall Seamus McDonnell	PU020362	6656

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JOSEPH J. LAKS, VICE PRESIDENT
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EXAMINER

CHU, GABRIEL L

ART UNIT	PAPER NUMBER
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2114

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/522,973

Applicant(s)

MCDONNELL ET AL.

Examiner

Gabriel L. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-8 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 2, 3, 5, 7, 8 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

3. Referring to claims 2, 3, 7, 8, and subsequently possibly claim 5, Applicant has claimed "at least one command". Applicant has amended claim to include the subject matter of what was formerly claim 5. Claim 5 was previously dependent on claim 4, which was dependent on claim 3, which was dependent on claim 2, which was dependent on claim 1. The former claim 5's language included "at least one command" and was subsequently included in the current claim 1. It is, then, unclear if claim 2 and 7's "at least one command" refers to the "at least one command" of claim 1, 6 and further, it is not clear to what claim 3 and 8's "at least one command" refers. For the purpose of examination, these claims are given the interpretation previously applied.

4. Referring to claim 5, it depends from a cancelled claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 6-8 rejected under 35 U.S.C. 102(e) as being anticipated by US

20030126315 to Tan et al.

7. Referring to claim Referring to claim 6, Tan discloses a storage system including at least one storage device for storing digitized information (Figure 1, storage devices.);

a host system for providing overall control of the media area network (Figure 1, host servers.);

and a host bus adapter for providing a link between the host system and the storage system (Figure 1, host bus adapters.), the method comprising the steps of monitoring, at a lower-level port driver in the host bus adapter, communication status between the storage system and the host bus adapter (Figure 4, monitor.),

and in the event of failure initiating switching at the lower-level port driver to activate an alternative port, thereby achieving fail-over recovery (Figure 4, failover. Further, from Tan, "[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is synchronized. The failover action in this embodiment is

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to activate the standby controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant.” and “[0046] The active path may fail which is detected by a number of methods including a command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant.”);

queuing requests from an original port that failed to an alternative port; canceling all outstanding requests on the original port; and issuing at least one command via the alternate port(From Tan, “[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is synchronized. The failover action in this embodiment is to activate the standby controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant.” and “[0046] The active path may fail which is detected by a number of methods including a

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command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant." Further, see paragraphs 21, 32, and 41, wherein only one controller is active at a time, e.g., it is switched from active, only one is presented at a time, and that the failed controller may even be replaced or rebooted. Inactivating controller thereby cancels pending requests/commands.).

8. Referring to claim 7, Tan discloses the step of monitoring the communication status between the storage system and the host bus adapter further comprises the step of determining whether the storage system successfully completed at least one command (From paragraph 35, "Path verification in monitoring 410 also occurs when command timeouts are received by the failover mechanisms.").

9. Referring to claim 8, Tan discloses the step of determining whether unsuccessful completion of the at least one command can be corrected by fail-over recovery (Figure 4, elements 430, 440.).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-3 rejected under 35 U.S.C. 103(a) as being unpatentable over US 20030126315 to Tan et al. in view of "real-time" by Microsoft Computer Dictionary (herein MSCD).

12. Referring to claim 1, Tan discloses a storage system including at least one storage device for storing digitized information (Figure 1, storage devices.);

a host system for providing overall control of the media area network (Figure 1, host servers.);

and a host bus adapter for providing a link between the host system and the storage system (Figure 1, host bus adapters.), the host bus adapter having a lower-level port driver that includes: means for monitoring communications between the storage system and the host bus adapter through an active port (Figure 4, monitor.),

and means for switching to an alternative port, thereby achieving fail-over recovery in the event of a communications failure (Figure 4, failover. Further, from Tan, "[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is synchronized. The failover action in this embodiment is to activate the standby

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controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant.” and “[0046] The active path may fail which is detected by a number of methods including a command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant.”);

means for queuing requests from an original port that failed to an alternative port; means for canceling all outstanding requests on the original port; and means for issuing at least one command via the alternate port (From Tan, “[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is synchronized. The failover action in this embodiment is to activate the standby controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant.” and “[0046] The active path may fail which is detected by a

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number of methods including a command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant." Further, see paragraphs 21, 32, and 41, wherein only one controller is active at a time, e.g., it is switched from active, only one is presented at a time, and that the failed controller may even be replaced or rebooted. Inactivating controller thereby cancels pending requests/commands.).

Although Tan does not specifically disclose that this failover is performed in real time, real time is well known in the art. An example of this is shown by MSCD, "Of or relating to a time frame imposed by external constraints. Real-time operations are those in which the machine's activities match the human perception of time or those in which computer operations proceed at the same rate as a physical or external process." A person of ordinary skill in the art at the time of the invention would have been motivated to use real-time in a failover process because, from MSCD, "a computer must respond to situations as they occur," and further Tan was motivated by speed, from paragraph 8, "Additionally, operating systems often provide hooks for controlling redundancy at improper levels which results in poor error handling and long latencies. Hooks and/or handshaking protocols that are used to allow the host and storage controller to act

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cooperatively in failover operations are lacking in industry-standard interconnects (such as SCSI-based interconnects, switches, and hubs), and have presently been built into host firmware via the host device drivers, which has further led to problems as each host and each host OS may implement different hooks and protocols. Many OS models dictate that redundancy control come from components that may introduce undesirable delays and interdependencies." Further, Tan appears to operate at speeds sufficient to meet Applicant's desire for "real time", from paragraph 35, "Monitoring 410 may include performing path verification periodically (e.g., path monitoring time interval of about 1 to 10 seconds or more and more preferably, about every 5 seconds) for each target redundant controller. The monitoring 410 by the failover mechanisms preferably includes monitoring all standby paths within the path monitoring time interval to make sure it is available or "safe" to failover when the path is needed. Path verification in monitoring 410 also occurs when command timeouts are received by the failover mechanisms."

13. Referring to claim 2, Tan discloses the monitoring means further comprises means for determining whether the storage system successfully completed at least one command (From paragraph 35, "Path verification in monitoring 410 also occurs when command timeouts are received by the failover mechanisms.").

14. Referring to claim 3, Tan discloses the monitoring means further comprises means for determining whether unsuccessful completion of the at least one command can be corrected by fail-over recovery (Figure 4, elements 430, 440.).

Allowable Subject Matter

15. Claim 11 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form **including all of the limitations of the base claim and any intervening claims**. Referring to claim 11, the prior art does not teach or fairly suggest the step of checking whether cancellation of the outstanding commands occurred, and if not then initiating fail-over recovery of any failed storage system controller.

Response to Arguments

16. Applicant's arguments filed 27 December 2006 have been fully considered but they are not persuasive. Regarding Applicant's argument (page 5) that Tan does not cancel, see above rejection, wherein the failed controller is inactivated.

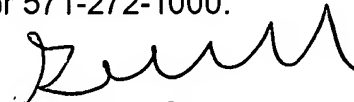
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gabriel L. Chu whose telephone number is (571) 272-3656. The examiner can normally be reached on weekdays between 8:30 AM and 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Gabriel L. Chu
Primary Examiner
Art Unit 2114

gc